

REMARKS

The Office Action mailed June 5, 2002 has been carefully considered.

In the Office Action, the Examiner rejected claims 1-8 under 35 U. S. C. §103 as being obvious over U. S. Patent No. 5,963,664 to Kumar et al (hereinafter "Kumar") in view of U. S. Patent No. 5,850,352 to Moezzi, et al. (hereinafter "Moezzi"). The Examiner also rejected claims 9-11, 24 and 25 under 35 U. S. C. §102 as being anticipated by U. S. Patent Application Publication No. US 2002/0005921 to Sasakura, et al. (hereinafter "Sasakura"), and claims 12 and 27 under 35 U. S. C. §103 as being obvious over Sasakura in view of U. S. Patent No. 5,130,794 to Ritchey (hereinafter "Ritchey"). The Examiner further rejected claims 13-23 under 35 U. S. C. §103 as being obvious over Kumar in view of Moezzi, and further in view of U. S. Patent No. 5,686,975 to Lipton (hereinafter "Lipton"). No claims have been allowed.

By this Response, Applicants are cancelling claims 1-27 and adding new claims 28-113 including new independent apparatus claims 28, 52, 56 and 59, new independent method claims 60, 85, 92 and 95, and new independent computer program product claims 97 and 125.

Applicants respectfully submit that the claims patentably distinguish over the references. Applicants will initially address independent apparatus claim 28, as also representative of independent method claim 60 and independent computer program product claim 97. Claim 28 is directed to a system for generating a stereoscopic panoramic mosaic image pair comprising a strip generator module and a mosaic image generator module. The strip generator module is configured to generate two series of image strips, with all of the image strips in each series comprising strips of a series of images of a scene as would be recorded by a camera from a respective series of positions relative to the scene, and with the image strips of the respective series representing strips of the respective images displaced from one another by at least one selected displacement. The mosaic image generator module is configured to mosaic the respective series of images strips together thereby to construct two panoramic mosaic images, the panoramic mosaic images comprising the stereoscopic panoramic mosaic image pair providing a stereoscopic image of the scene as recorded over the path.

Preliminarily, regarding claim 28, Applicants note that the strip generator module is recited as generating image strips from images *as would be* recorded by a camera. This language is used for several purposes. For example, the language is used to make clear that the images would not actually need to be recorded by a camera, but instead may be generated by other means, such as, for example, a computer graphics arrangement, as is specifically recited in claim 32. In addition, the language is used to make clear that the strip generator module does not have to generate, for each image strip, an entire image--instead, the strip generator module need only generate the respective image strip.

Applicants respectfully submit that the references neither teach nor suggest the invention recited in claim 28. Applicants will address the Kumar and Moezzi references in connection with claim 28. Kumar describes a system for generating a three-dimensional mosaic of a scene using a plurality of images of the scene. In Kumar's system, information from the images are used to generate two mosaics, including what appears to be a image mosaic representing a panoramic view of the scene and a shape mosaic representing the three-dimensional geometry of the scene. The image mosaic is a conventional two-dimensional mosaic derived from a series of images of the scene that overlap somewhat along their edges to facilitate mosaicing them together. For the three-dimensional shape mosaic, a pair of images are used, one of which is referred to as a reference image and the other as an inspection image. Both images are used to simulate a parametric reference surface in the portion of the scene that appears in both images. In addition, both images are used to generate a parallax displacement field for the portion of the scene that appears in both images. The parallax displacement field comprises a plurality of parallax displacement vectors in the reference image. Each parallax displacement vector is associated with a point on the surface of an object in the scene and the magnitude and direction corresponds to the displacement of the point P (referring to Kumar FIG. 3) in the scene from the point Q on the parametric reference surface that corresponds to the projection of the point P onto the parametric reference surface along the line from the optical center M of the camera that recorded the inspection image. After the parametric reference surface and parallax displacement field have been generated, the three-dimensional shape mosaic is generated.



While Kumar describes a system for generating two mosaics, the mosaics are very different from those generated by the arrangement recited in claim 28. In the arrangement recited in claim 28, the two mosaic images comprise a panoramic mosaic image pair that, when viewed contemporaneously by respective left and right eyes, facilitate panoramic stereoscopic viewing of a scene. The mosaics generated by Kumar's system comprise one conventional two-dimensional image mosaic and a three-dimensional mosaic, and there is no suggestion that they are to be viewed contemporaneously by respective eyes of a viewer or that, if they were, that would facilitate panoramic *stereoscopic* viewing of the scene. The Examiner recognizes this deficiency and cites Moezzi as teaching that "respective left and right eyes facilitate panoramic stereoscopic viewing of a scene." While Moezzi does teach that respective left and right eyes facilitate *stereoscopic* viewing of a scene, Applicants respectfully submit that it does not teach that respective left and right eyes facilitate *panoramic stereoscopic* viewing of a scene. Regardless, Applicants respectfully submit that there is no suggestion in either Moezzi or Kumar of generating two panoramic images, that, when a viewer views them contemporaneously with his or her respective left and right eyes, facilitate panoramic stereoscopic viewing of the scene, with each of the images being generated by mosaicing together respective left and right strips from a series of images, as is required in the claim.

More specifically, Moezzi teaches an arrangement that generates two two-dimensional images (a "stereoscopic image pair") that facilitate stereoscopic viewing of a scene, but the arrangement generates the images from a three dimensional model of the scene. The three-dimensional model is, in turn, generated from two-dimensional images of the scene. Accordingly, Moezzi's arrangement uses two-dimensional images to generate a three-dimensional model, from which a stereoscopic image pair is generated. Thus, Moezzi's arrangement goes from two-dimensional images, to a three-dimensional model, and again to two-dimensional images (the stereoscopic image pair). In the arrangement recited in claim 28, it is unnecessary to generate a three-dimensional model; each of the left and right panoramic mosaic images can be generated directly from the two-dimensional images.

Accordingly, Applicants respectfully submit that claim 28 patentably distinguishes over the references. Applicants further submit that method claim 60 and computer program product claim 97 also patentably distinguish over the references for the same reasons as set forth above in

connection with claim 28. Applicants further submit that the claims that depend directly or indirectly from independent claims 28, 57 and 87 are allowable at least for the reason that they depend from allowable independent claims.

Applicant will address independent apparatus claim 52, as representative also of new independent method claim 85 and new independent computer program product claim 125. Apparatus claim 50 is similar to apparatus claim 28, except that apparatus claim 52 also calls for at least two selected displacements of the image strips. This allows for changing the stereoscopic disparity as between different parts of the stereoscopic panorama when images comprising the stereoscopic panoramic mosaic image pair are viewed together. Applicants submit that claim 50 is allowable at least for the reasons set forth above in connection with claim 28. Applicant further submits that method claim 85 and computer program product claim 125 are allowable at least for the reasons set forth above in connection with claim 52, and that the claims depending directly or indirectly from claims 52, 85 and 125 are allowable at least for the reason that they depend from allowable independent claims.

Applicants further submit that independent apparatus claims 56 and 59 and independent method claims 92 and 95 patentably distinguish over the references. These claims are directed to systems and methods for displaying panoramic stereoscopic images to a viewer, along the lines described in connection with FIGS. 12A and 12B. Applicant will address new claim 56 as also being representative of method claim 92. Claim 56 recites a system for displaying a stereo panoramic image to a viewer, the system comprising a panoramic screen, a plurality of projectors and a viewing arrangement. The various projectors are disposed to project a respective portion of one of a plurality left and right panoramic images in overlapping fashion on the screen. The viewing arrangement facilitates transmission of a respective one of said images to each of the viewer's eyes thereby to facilitate stereoscopic viewing of the panoramic image defined by the left and right panoramic images.

The Examiner cited Sasakura in connection with claim 9, which is directed to a system for displaying a stereo panoramic image to a viewer, and so Applicants will address claim Sasakura in connection with claim 56 here. Sasakura describes an arrangement for displaying images stereoscopically to a viewer. In Sasakura's arrangement, the images for the respective eyes are



projected directly into the respective eyes. There is no suggestion in Sasakura of projecting images onto a panoramic screen in an overlapping manner, and providing an arrangement for the viewer to use to disambiguate the respective images for the respective eyes, as required in the patent claim. Accordingly, Applicants respectfully submit that Sasakura neither teaches nor suggests the invention recited in claim 56.

Applicants further submit that Sasakura neither teaches nor suggests the invention recited in method claim 92 for the reasons set forth above in connection with claim 56.

Applicants will address new independent apparatus claim 59 as also being representative of independent method claim 95. Claim 59 is directed to a system for displaying a stereo panoramic image to a viewer, the system comprising a panoramic screen, a plurality of projectors and a viewing arrangement. Each projector is configured to project a respective portion of a panoramic image on the screen, the panoramic image comprising alternating portions of panoramic images each to be alternately viewed by respective ones of a viewer's eyes. The viewing arrangement facilitates alternating transmission of the respective alternating portions to respective ones of the viewer's eyes thereby to facilitate stereoscopic viewing of the panoramic image. Essentially, claim 59 is directed to the arrangement described on page 19, lines 19-23 of the specification. There is no suggestion in Sasakura of projecting images onto a panoramic screen in an alternating manner, and providing an arrangement for the viewer to use to disambiguate the respective images for the respective eyes, as required in the patent claim. Accordingly, Applicants respectfully submit that Sasakura neither teaches nor suggests the invention recited in claim 59.

Applicants further submit that Sasakura neither teaches nor suggests the invention recited in method claim 95 for the reasons set forth above in connection with claim 59.

The dependent claims are allowable at least for the reason that they depend directly or indirectly from the respective allowable independent claims.



It is believed that this application is allowable, and a notice of allowability is respectfully solicited.

Respectfully submitted,

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